I claim:

1. A reactor for processing a semiconductor substrate, said reactor comprising:

a reactor housing defining a processing chamber, said processing chamber being adapted to support a semiconductor substrate therein; and

at least one gas injection assembly for injecting at least one gas into said processing chamber and onto the substrate and being adapted to ionize the gas injected into said processing chamber to increase the reactivity of said gas with the substrate to thereby enhance the processing of the semiconductor substrate.

2. The reactor according to Claim 1, further comprising a heater for selectively heating the substrate in said processing chamber.

3. The reactor according to Claim 2, further comprising a heater housing supported in said reactor housing and enclosing said heater therein, said heater housing being adapted to rotatably support the substrate in said processing chamber.

4. The reactor according to Claim 1, wherein said gas injection assembly includes a plasma generator, said plasma generator for ionizing the gas into a gas plasma.

5. The reactor according to Claim 4, wherein said plasma generator generates electromagnetic field, said electromagnetic field for ionizing the gas into a gas plasma.

6. The reactor according to Claim 4, wherein said plasma generator ionizes said gas exteriorly of said processing chamber to isolate the substrate from said electromagnetic field.

7. The reactor according to Claim 1, wherein said gas injection assembly includes a gas injection tube, said gas injection tube for delivering the ionized gas into said processing chamber.

8. The reactor according to Claim 7, wherein said injection tube includes a plurality of orifices through which the ionized gas is delivered into said processing chamber.

9. The reactor according to Claim 7, wherein said gas injection tube comprises a quartz tube.

10. The reactor according to Claim 8, wherein said gas injection assembly further includes a plasma generator, said generator for ionizing the gas into a gas plasma, and said injection tube for injecting the ionized gas from said generator into said processing chamber.

11. The reactor according to Claim 10, wherein said gas injection assembly further includes a supply tube in communication with said injection tube, said supply tube for delivering gas to said injection tube, and said plasma generator for ionizing the gas into a gas plasma in said supply tube.

12. The reactor according to Claim 11, wherein said plasma generator includes a generator tube in communication with said supply tube and generates an electromagnetic field in said generator tube to ionize the gas flowing into said supply tube into a gas plasma.

13. The reactor according to Claim 11, wherein said supply tube has a larger diameter than said generator tube such that the gas undergoes dissociation and ionization within said supply tube.

14. The reactor according to Claim 13, where said supply tube comprises a quartz tube.

15. The reactor according to Claim 1, wherein said gas injection assembly includes at said least two gas injection tubes, one of said gas injection tubes injecting a first gas in processing, and a second of said gas injection tubes injecting a second gas in said processing chamber, and said gas injection assembly ionizing at least one of said first and second gases into a gas plasma for injecting into said processing chamber.

16. A reactor for processing a semiconductor substrate, said reactor comprising:

a reactor housing defining a processing chamber and being adapted to support the substrate in said processing chamber;

a plasma generator for ionizing at least one gas into a gas plasma; and

at least one gas injector, said gas injector being adapted to inject the ionized gas into said processing chamber and onto the substrate supported therein for processing the substrate.

17. The reactor according to Claim 16, wherein said plasma generator includes a generator tube and a coil inducing an electromagnetic field in said generator tube to ionize the gas flowing through the generator tube, and said generator tube directing the ionized gas to said gas injector for injecting into said processing chamber.

18. The reactor according to Claim 17, further comprising a supply tube in communication with said injection tube, said generator tube directing the gas into the supply tube.

19. The reactor according to Claim 18, wherein said supply tube has a greater diameter than said generator tube such that the gas under goes dissociation and ionization in said supply tube.

20. The reactor according to Claim 16, wherein said gas injector comprises an elongate tube with a plurality of orifices through which the gas is injected into said processing chamber.

21. The reactor according to Claim 20, wherein said orifices are uniformly spaced along said elongate tube.

22. The reactor according to Claim 16, wherein said housing includes a cover, said gas injector being supported in said cover.

23. The reactor according to Claim 22, wherein said plasma generator is supported by said cover exteriorly of said processing chamber to isolate the substrate from the plasma generator.

24. The reactor according to Claim 16, wherein said at least one gas injector comprises at least two gas injectors for injecting at least one gas into said processing chamber.

25. The reactor according to Claim 24, wherein said gas injectors are isolated from each other to avoid contamination.

26. The reactor according to Claim 25, wherein one of said gas injectors is adapted to inject a first gas into said processing chamber, and another of said injectors is adapted to inject a second gas into said processing chamber.

27. The reactor according to Claim 26, wherein said plasma generator ionizes at least one of the first and second gases into a gas plasma for injection into the processing chamber.

28. The reactor according to Claim 26, further comprising a heater for heating the substrate in said processing chamber.

29. The reactor according to Claim 28, wherein said heater selectively heats the substrate in said processing chamber.

30. The reactor according to Claim 28, wherein said heater is enclosed in a heater housing, said heater housing being supported in said reactor housing.

31. The reactor according to Claim 30, wherein said heater housing provides support for the substrate in said reactor housing.

32. A method of processing a semiconductor substrate comprising the steps of:
providing a processing chamber;
supporting the substrate in the processing chamber;
ionizing a gas; and
injecting the ionized gas into the processing chamber onto the substrate for processing the semiconductor substrate.

33. The method of processing a semiconductor substrate according to Claim 32, wherein ionizing a gas includes ionizing the gas into plasma.

34. The method of processing a semiconductor substrate according to Claim 32, wherein ionizing includes applying an electromagnetic field to the gas.

35. The method of processing a semiconductor substrate according to Claim 34, wherein applying an electromagnetic field includes applying a radio frequency field to the gas.

36. The method of processing a semiconductor substrate according to Claim 34, further comprising isolating said electromagnetic field form the substrate.

37. The method of processing a semiconductor substrate according to Claim 32, further comprising rotating the substrate in the processing chamber during processing.

38. The method of processing a semiconductor substrate according to Claim 32, further comprising measuring the emissivity of the substrate during processing.

39. The method of processing a semiconductor substrate according to Claim 32, further comprising heating the substrate during processing.

40. The method of processing a semiconductor substrate according to Claim 32, wherein injecting the ionized gas includes directing the ionized gas onto at least a discrete portion of the substrate.

41. The method of processing a semiconductor substrate according to Claim 32, further comprising injecting a second gas into the chamber onto the substrate for processing the semiconductor substrate.

42. The method of processing a semiconductor substrate according to Claim 41, wherein injecting a second gas includes directing the second gas onto a discrete portion of the substrate.

43. The method of processing a semiconductor substrate according to Claim 32, further comprising selectively varying the flow of the ionized gas into the processing chamber.

44. The method of processing a semiconductor substrate according to Claim 32, further comprises cleaning the substrate with a ionized gas.

45. The method of processing a semiconductor substrate according to Claim 32, wherein ionizing a gas includes ionizing silane.

46. The method of processing a semiconductor substrate according to Claim 45, further including ionizing oxygen, and injecting the ionized silane and oxygen into the processing chamber.

47. The method according to Claim 32, wherein ionizing includes ionizing nitrogen.

48. The method according to Claim 32, wherein ionizing includes ionizing a fluorine containing gas.

49. The method according to Claim 48, wherein ionizing a fluorine containing gas includes ionizing one of hydrogen Freon, NF_3 and XeF_2.

50. The method according to Claim 32, wherein ionizing includes ionizing hydrogen.

51. The method according to Claim 32, wherein ionizing includes ionizing oxygen.

52. The method according to Claims 32, wherein ionizing includes ionizing silane and ammonia.

53. The method according to Claim 32, further comprising injecting a reactant gas into the processing chamber.

54. The method according to Claim 53, wherein ionizing includes ionizing ammonia and injecting a reactant gas includes injecting silane.